CLAIMS

What is claimed is:

1. A metal alloy comprising at least two metal elements, said alloy being capable of forming a surface metal oxide layer that is conductive.

2. An alloy in accordance with Claim 1 wherein said surface metal oxide layer exhibits an electrical surface resistance equal to about 0.0015 Ωcm^2 or less.

3. An alloy in accordance with Claim 1 selected from the group of alloys consisting of chemical elements having the symbols Y-Ba-Cu, La-Sr-Co, La-Sr-Cr, La-Sr-V, La-Ca-Mn, La-Sr-Mn, La-Nd-Ni, Ti-Ta, Ti-Nb, Ti-V, Ti-W, Ti-Mo, Ti-Zr-Ta, Ti-Zr-Nb, Cr-Ta, Cr-Nb, Cr-Ti, Cr-Zr, Sr-V, Cu-Ti, Cu-Fe, Cu-Mn, Cu-Al, Cu-Si, Sn-Sb, Sn-In, Ni-Li, and combinations thereof.

4. An alloy in accordance with Claim 1 wherein a first metal element is a main metal and an additional metal element is a dopant.

5. An alloy in accordance with Claim 4 wherein said dopant is present in said alloy in a range between about 1 atom percent and about 50 atom percent.

6. An alloy in accordance with Claim 4 wherein said dopant is present in said alloy between about 1 atom percent and about 10 atom percent.

7. An alloy in accordance with Claim 4 wherein said dopant is present in said alloy in a range between about 1 atom percent and about 3 atom percent.

8. An alloy in accordance with Claim 4 wherein said main metal is titanium and said dopant is selected from the group consisting of niobium and tantalum.

9. An alloy in accordance with Claim 4 wherein said main metal is copper and said dopant is selected from the group consisting of aluminum, silicon, iron, manganese, vanadium, and titanium.

10. An alloy in accordance with Claim 4 wherein the radius of said dopant metal atom differs from the radius of said main metal atom by less than about twenty percent.

11. An alloy in accordance with Claim 4 wherein the radius of a cation of said dopant metal differs from the radius of a cation of said main metal by less than about twenty percent.

12. An alloy in accordance with Claim 11 wherein said dopant cation is in a higher valence state than said main metal cation.

13. An alloy in accordance with Claim 11 wherein said dopant cation is in a lower valence state than said main metal cation.

14. An alloy in accordance with Claim 4 wherein said dopant metal and said main metal are present as an atomic solid solution.

15. An alloy in accordance with Claim 4 wherein oxide compounds of said dopant metal and oxide compounds of said main metal are present as a solid solution of said compounds.

16. An electrical contact for use in an electromechanical apparatus, comprising a metal alloy of at least two metal elements, said alloy being capable of forming surface metal oxide layers that are conductive.

17. A contact in accordance with Claim 16 wherein said entire contact is formed of said metal alloy.

18. An electrical contact in accordance with Claim 16 comprising:

a) a conductive core portion formed of base metal; and

b) an outer portion formed of said metal alloy and having said surface metal oxide layers that are conductive.

19. An electromechanical apparatus, comprising an electrical contact including a metal alloy of at least two metal elements, said alloy being capable of forming a surface metal oxide layer that is conductive.

20. An apparatus in accordance with Claim 15 wherein said apparatus includes a fuel cell.

21. An apparatus in accordance with Claim 20 wherein said fuel cell is a proton exchange membrane fuel cell.

22. An apparatus in accordance with Claim 20 wherein said fuel cell is a solid-oxide fuel cell.

23. An apparatus in accordance with Claim 19 wherein said electrical contact is an electrical terminal.

24. An apparatus in accordance with Claim 19 wherein said electrical contact is an interconnect for an electronic system.